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ABSTRACT

Within the context of school improvement and school reform, it is important to examine Howard Gardner's theory of multiple intelligences (MI theory). His work has far-reaching implications for curriculum development and classroom implementation. Gardner believes that the culture defines intelligence too narrowly. He sought to broaden the scope of human potential beyond the confines of the ability to answer items on tests of intelligence and an IQ score. He was disturbed by the almost exclusive use of linguistic and logical capacities in the construction of items on intelligence, aptitude, and achievement tests. The MI theory challenges the concept of intelligence as a single general capacity that everyone possesses in varying degrees. Gardner suggests that intelligence has more to do with the capacity for solving problems and fashioning products in a context-rich and naturalistic setting. He identified seven areas of intelligence, which he believes all people possess: (1) linguistic intelligence: (2) logical-mathematical intelligence; (3) spatial intelligence; (4) bodily-kinesthetic intelligence; (5) musical intelligence; (6) interpersonal intelligence; (7) intrapersonal intelligence. A number of school projects have grown out of the thinking of Gardner and other liberals like John Dewey, Rousseau, Maria Montessori, and Friedrich Froebel. Using the seven intelligences as their framework, teachers at Crow Island School in Winnetka, Illinois, assess their students using a portfolio approach. (Contains 19 references and an appendix listing Gardner's criteria.) (TB)

Multiple Intelligences in the Schools

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Within the context of school improvement and school reform, it is important to examine Howard Gardner's theory of multiple intelligences (MI theory). His work has far-reaching implications for curriculum development and classroom implementation. This paper will discuss Howard Gardner's seven intelligences, noting the implications for education and addressing the issues of assessment.

Early studies of the intellect can be traced to Franz Joseph Gall's observations of the relationship between certain mental characteristics of his schoolmates and the shapes of their heads. When he became a physician and scientist, his studies became a part of a discipline called 'phrenology'. By studying the shape of the skull, researchers believed they could determine the strengths, weaknesses, and idiosyncrasies of a mental profile. The work of Gall and his colleague, Joseph Spurzheim, was very popular in Europe and the United States during the early part of the nineteenth century.

Francis Galton, one of the first psychologically oriented scientists to try to measure the intellect directly, sought to measure intelligence and hoped, through proper 'breeding,' to increase the overall intelligence of the population (Gardner & Hatch, 1989). At the turn of the century, scientists began to look at capacities such as language and abstraction

to gain a more accurate assessment of human intellectual powers (Gardner, 1983). Early in the twentieth century, Alfred Binet, with his colleague, Theodore Simon, devised the first tests of intelligence in order to determine which primary grade students were 'at risk' for failure so that these students could receive remedial attention and to place other children at their appropriate grade level. Intelligence testing became widespread, and intelligence became something that could be measured and reduced to a single number or 'IQ' score.

Gardner debated Paiget's view of conceptualizing all aspects of symbol use as part of a single 'semiotic' function (Gardner & Hatch, 1989). Certainly Paigei's stages of development led to a more developmental approach to instruction. Gardner's MI theory provides a much broader and interactive approach to learning.

Gardner believed that our culture defined intelligence too narrowly. He sought to broaden the scope of human potential beyond the confines of the ability to answer items on tests of intelligence and an IQ score. Over the past decade, Gardner's research led him to challenge the concepts of intelligence. On a theoretical level, he studied the development and breakdown of cognitive and symbol-using capacities, becoming more convinced that the human mind may be quite modular in design (Gardner, 1974). On a more practical level, he was disturbed by the almost exclusive use of linguistic and logical capacities

in the construction of items on intelligence, aptitude, and achievement tests. The MI theory challenges the concept of intelligence as a single general capacity that everyone possesses in varying degrees which can best be measured by standardized verbal instruments, such as short-answer, paper-and-pencil tests. Gardner suggests that intelligence has more to do with the capacity for (1) solving problems and (2) fashioning products in a context-rich and naturalistic setting (Armstrong, 1987). Gardner defines human cognitive competence in terms of a set of abilities, talents, or mental skills, which he calls intelligences. From this broader and more pragmatic perspective, the concept of intelligence becomes a more functional concept that can be seen in people's lives. Gardner explains the broad range of abilities that humans possess by grouping their capabilities into seven comprehensive categories or 'intelligences':

> **Linguistic Intelligence**: the capacity to use words effectively, whether orally or in writing.
>
> **Logical-Mathematical Intelligence**: The capacity to use numbers effectively.
>
> **Spatial Intelligence**: The ability to perceive the visual-spatial world accurately and to perform transformations upon those perceptions.
>
> **Bodily-Kinesthetic Intelligence**: Expertise in using one's whole body to express ideas and feelings and facility in using one's hands to produce or transform things.

Musical Intelligence: The capacity to perceive, discriminate, transform, and express musical forms.

Interpersonal Intelligence: The ability to perceive and make distinctions in the moods, intentions, motivations, and feelings of other people.

Intrapersonal Intelligence: Self-knowledge and the ability to act adaptively on the basis of that knowledge. (Armstrong, 1994).

Gardner chose to be provocative by using the word intelligence to describe each category rather than aptitude or talent. He felt that aptitude or talent would only raise minor questions of interest rather than sound theoretical inquiries.

Certain key elements make up MI Theory. Gardner posits that each person possesses all seven intelligences and that most people can develop each intelligence to an adequate level of competency. It is also important to note that the intelligences usually work together in complex ways. Intelligences are always interacting with each other. In addition, there are many ways to be intelligent within each category. There is no standard set of attributes that one must have to be considered intelligent in a specific area. Gardner points out that his model of seven intelligences is a tentative one; further research may bring about revisions of the original or additions. Other intelligences that have been proposed include: spirituality, moral sensibility, sexuality, humor,

intuition, creativity, culinary ability, olfactory perception, and an ability to synthesize the other intelligences.

To provide a theoretical foundation for his claims, Gardner has set up certain basic 'tests' that each intelligence had to meet to be considered a full-fledged intelligence and not simply a talent, skill or aptitude. (Appendix A) Research is currently under way in a variety of settings to test the theory. Gardner, by his own admission, has turned his attention to educational interventions and implications. In the field of education, the MI theory encourages many people to rethink how schools value and support the abilities of children. Gardner and his colleagues at Project Zero promote the idea that curricula and assessment need to reflect the authentic kinds of activities that students are likely to encounter.

The MI theory has created a grass-roots effort to change the way educators look at the current educational system. The conventional system has failed to address the diverse needs and strengths of students. Curriculum development arising from an MI approach tends to emphasize changes in organizational structures and alternative assessment strategies. In many cases, schools create teacher teams made up of teachers with different specialities. In the process, teachers start to discover their own intelligences.

Project-based learning has emerged as an effective way to put theory into practice. Project-based learning provides an integrated apporach to a course of study. Multiple methods - teaching strategies, materials, content areas, and assessment modes are integrated to provide the students with many opportunities to learn and grow. This type of environment supports the MI theory by addressing as many of the seven intelligences as possible.

It is important to note that multimodal teaching is hardly a new concept. Even Plato, in a manner of speaking, seemed aware of the importance of multimodal teaching when he wrote: "...do not use compulsion, but let early education be a sort of amusement; you will then be better able to find out the natural bent" (Plato 1952, p. 399). The 18th century philosopher Jean Jacques Rousseau, in his treatise on education, *Emile*, declared that the child must learn not through words, but through experience, not through books, but through 'the book of life.' The Swiss reformer Johann Heinrich Pestalozzi emphasized an integrated curriculum - physical, moral, and intellectual training based on concrete experiences, Friedrich Froebel, Maria Montessori, and John Dewey constructed curriculum and systems of instruction through hands-on life-type experiences. Current educational models - cooperative learning, whole language, complex instruction, thematic instruction - utilize multiple-intelligence systems. "MI theory essentially encompasses

what good teachers have always done in their teaching: reaching beyond the text and the blackboard to awaken students' minds (Armstrong, 1994).

The Mather After School Project is an example of ways teachers and students have used project-based learning for the development of literacy and thinking skills. In addition, the project, based in an urban, culturally diverse neighborhood in Boston," provides teachers with a comfortable setting outside the traditional pressures of standardized tests, coverage, and other administrative demands" (Hatch, 1993). Initially the goal was to create specific projects with groups of third-fifth graders that could be used over and over again. However, the most successful projects drew directly from the interests of the teachers and students and were flexible enough to grow with new ideas as they arose.

Arts PROPEL, another of Gardner's projects, also provides a model for learning by way of projects. The arts projects provide a rich series of exercises to help students focus on a particular aspect of an art form. Students work throught the projects, keeping their drafts, revisions, final products, and observations in a portfolio. This documentation serves as a catalyst for student reflections and self-assessment.

Project Spectrum uses a similar technique. Students are provided with a variety of rich materials designed to simulate particular inteligences. Teachers and students record the various actitivies chosen

by the students along with products from the activity - thus providing a profile of the student's interests and progress. These reports play a large role in the ultimate assessment. Assessing learning through multiple intelligences presents a challenge. Assessment within the context of MI theory becomes a more holistic way of looking at what the child knows. An assessment plan for multiple intelligences would include problem-solving and product-fashioned approaches. An assessment of a particular set of intelligences would include materials of that intelligence. It is possible to address assessment in multiple ways if criteria are clearly articulated in advance. Using rubrics can help teachers determine if students grasp a concept. A well-balanced approach to assessment will provide students and teachers with a more holistic picture of what students know.

At Crow Island School in Winnetka, Illinois, faculty and staff began a project focused on the assessment of children's learning using a portfolio approach. Portfolio assessment has become popular as educators search for new ways of looking at student achievement. The Crow Island faculty used the seven intelligences as their framework for portfolio assessment. Their philosophy of education includes: a commitment to a developmental instruction; priority placed on consideration of the 'whole child' ; the absence of letter grades until 7th grade; and high regard for teachers as professionals (Hebert, 1992).

More classroom activities that provide opportunities for students to develop within the seven intelligences include: career day, field trips, biographies, expanded lesson plans, wall displays, shelf displays, readings, MI Tables, Human Intelligence Hunt, and board games. These are just but a few of the ideas which promote and enhance seven intelligences.

In a classroom where all seven intelligences are addressed, students become more well-rounded, school becomes more engaging and motivating, and students are more apt to succeed. The multiple range of activities helps to uncover hidden strengths and interests among children. Career exploration would certainly be enhanced using an MI theory approach. Students' skills, talents, and interests would be tapped at an early enough age to provide guidance and direction toward future endeavors.

In her article on learning styles, Kathleen Butler describes a classroom environment which not only addresses students' different styles of learning but allows for the growth and nurturing of multiple intelligences. Her examples include: building a flexible classroom, teaming with others, observing students, building on strengths, asking students to think about their own thinking, helping students vary their own styles of learning, asking students open-ended questions, offering students choices, and examining the curriculum to provide a

wide variety of activities (Butler, 1988). This approach moves toward teaching the whole child. An important component as well is to survey, then challenge each of a student's abilities. By providing and encouraging a variety of experiences, teachers can help students to discover and gain confidence in those areas of intelignece in which they excel.

In her book, Cognitive Processes in Education, Sylvia Farnham-Diggory groups kinds of knowledge into five general categories: declarative - refers to the fact that the information can be transmitted symbolically; procedural - unconscious and automatic; conceptual - knowledge that is acquired inductively; analogical - type of knowledge that preserves specific corresponsdences between what is out there in the world, and what is inside your head; and logical - arises from the exercise of one's own reasoning, not from automating a skill (Farnham-Diggory, 1992). She notes that researchers have focused on different paradigms of learning (i.e.words and acquisition of facts, study of skills, acquisition of concepts, one-trial recognition learning, and the study of problem-solving and reasoning). The different learning paradigms suggest that different kinds of knowledge is being acquired. "If these different types of knowledge are acquired in different ways, then it is quite important to arrange school instruction accordingly" (Farnham-Diggory, 1992). There seems a comfortable parallel between Gardner's MI theory

and its application to classroom learning with Farnham-Diggory's categories of knowledge.

Whatever the fate of these approaches, MI theory has the potential to dramatically alter the ways in which we think about schools and education (Blythe & Gardner, 1990). It is well documented that every child has his/her own best style of learning and that students do not learn as well when that style is thwarted. Th MI theory as applied to a classroom environment allows the child to learn and grow through multiple ways. "Kids learn best when their strengths are identified and their teachers and other adults build on those strengths" (Butler, 1988). The MI theory provides this kind of educational foundation - where a student's strengths are identified and fostered - where education is seen in terms of multiple ways of knowing and doing.

Appendix A - Criteria

To provide a theoretical foundation for his claims, Gardner set up certain basic 'tests' that each intelligence had to meet to be considered a full-fledged intelligence and not simply a talent, skill, or aptitude. The criteria he used include the following eight factors:

Potential Isolation by Brain Damage. Through his work at the Boston Veterans Administration, Gardner worked with individuals who had suffered accidents or illnesses that affected specific areas of the brain and brain functions, yet might still be able to other functions.

The Existence of Savants, Prodigies, and Other Exceptional Individuals. Gardner suggests that in some people we can see single intelligences operating at high levels.

A Distinctive Developmental History and a Definable Set of Expert 'End-State' Performances. Gardner suggests that intelligences are galvanized by participation in some kind of culturally valued activities and that the individual's growth in such an activity follows a developmental pattern.

An Evolutionary History and Evolutionary Plausibility. Gardner concludes that each of the seven intelligences meets the test of having its roots deeply embedded in the evolution of human beings and, even earlier, in the evolution of other species.

Support from Psychometric Findings. Standardized measures of human ability provide the'test' that most theories of intelligence use to ascertain the validity of a model. Gardner suggests that we can look at many existing standardized test for support of the theory of multiple intelligences.

Support from Experimental Psychological Tasks. Gardner suggests that by looking at specific psychological studies, we can witness intelligences working in isolation from on another.

An Identifiable Core Operation or Set of Operations. Gardner says that much as a computer program requires a set of operations in order for it to function, each intelligence has a set of core operations that serve to drive the various activities indigenous to that intelligence.

Susceptibility to Encoding in a Symbol System. One of the best indicators of intelligence behavior, according to Gardner, is the capacity of human beings to use symbols. (Armstrong, 1994).

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